Email Address Internationalization (EAI)
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Downgrading mechanism for Email Address Internationalization
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Abstract

Traditional mail systems handle only ASCII characters in SMTP envelope and mail header fields. The Email Address Internationalization (UTF8SMTP) extension allows UTF-8 characters in SMTP envelope and mail header fields. To avoid rejecting internationalized Email messages when a server in the delivery path does not support the UTF8SMTP extension, some sort of converting mechanism is required. This document describes a downgrading mechanism for Email Address Internationalization. Note that this is a way to downgrade, not tunnel. There is no associated up-conversion mechanism, although internationalized email clients might use original internationalized addresses or other data when displaying or

replying to downgraded messages.

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1. Introduction

Traditional mail systems which are defined by [RFC5321] and [RFC5322] allow ASCII characters in SMTP envelope and mail header field values. The UTF8SMTP extension [RFC4952], [RFC5335] and [RFC5336] allows UTF-8 characters in SMTP envelope and mail header field values.

If an envelope address or header field contains non-ASCII characters, the message cannot be delivered unless every system in the delivery path supports UTF8SMTP. This document describes a downgrading mechanism to avoid rejection of such messages when a server which does not support the UTF8SMTP extension is encountered. Downgrading mechanism converts envelope and header fields to an all-ASCII representation.

[RFC5335] allows UTF-8 characters to be used in mail header fields and MIME header fields. The downgrading mechanism specified here converts mail header fields and MIME header fields to ASCII.

This document does not change any protocols except by defining new header fields. It describes the conversion method from the internationalized email envelopes/messages which are defined in [RFC4952] [RFC5335] [RFC5336] to the traditional email envelopes/ messages which are defined in [RFC5321] [RFC5322].

[RFC5336] section 2.2 defines when downgrading occurs. If the SMTP client has an UTF8SMTP envelope or an internationalized message and the SMTP server doesn't support the UTF8SMTP SMTP extension, then the SMTP client MUST NOT send a UTF8SMTP envelope or an internationalized message to the SMTP server. The section shows 4 choices. The fourth choice is downgrading, as described here.

Downgrading may be implemented in MUAs, MSAs, MTAs which act as the SMTP client, or in MDAs, POP servers, IMAP servers which store or offer UTF8SMTP envelopes or internationalized messages to non-UTF8SMTP compliant systems which include message stores.

This document tries to define the downgrading process clearly and it preserves the original information as much as possible.

Downgrading in UTF8SMTP consists of the following four parts:

- New header fields definition
- SMTP downgrading
- Email header fields downgrading
- MIME header fields downgrading

In Section 3, many header fields starting with "Downgraded-" are

introduced. They preserve the original envelope information and the original header fields.

The SMTP downgrading is described in Section 4. It generates ASCII only envelope information from an UTF8SMTP envelope.

The Email header fields downgrading is described in Section 5. It generates ASCII only header fields.

The MIME header fields are expanded in [RFC5335]. The MIME header fields downgrading is described in Section 6. It generates ASCII only MIME header fields.

2. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [RFC2119].

All specialized terms used in this specification are defined in the EAI overview [RFC4952] or in [RFC5321][RFC5322], MIME documents [RFC2045] [RFC2047] [RFC2183] [RFC2231]. The terms "ASCII address", "internationalized email address", "non-ASCII address", "i18mail address", "UTF8SMTP", "message" and "mailing list" are used with the definitions from [RFC4952] document.

This document depends on [RFC5335], [RFC5336], and [RFC5337]. Key words used in these document are used in this document, too.

The term "non-ASCII" is an UTF-8 string which contains at least one non-ASCII character.

An "UTF8SMTP envelope" has Email originator/recipient addresses expanded by [RFC5336] and [RFC5337].

An "UTF8SMTP message" is Email messages expanded by [RFC5335].

3. New header fields definition

New header fields starting with "Downgraded-" are defined here to preserve those original envelope and header values which contain UTF-8 characters. During downgrading, one new "Downgraded-" header field is added for each original envelope or header field which cannot be passed as-is to a server which does not support UTF8SMTP. The original envelope or header field is removed or rewritten. Only those envelope and header fields which contain non-ASCII characters

are affected. The result of this process is a message which is compliant with existing email specifications [RFC5321] and [RFC5322]. The original internationalized information can be retrieved by examining the "Downgraded-" header fields which were added. Even though the information is not lost, the original message cannot be perfectly reconstructed. Hence, downgrading is a one-way process. However, an internationalized client might use the information in the "Downgraded-" header fields when processing a downgraded message, for example, such as displaying or composing a reply.

3.1. Envelope information preservation headers

SMTP envelope downgraded information <downgraded-envelope-addr> consists of the original non-ASCII address and the downgraded all-ASCII address.

```
downgraded-envelope-addr = [FWS] "<" [ A-d-l ":" ] uMailbox
        FWS "<" Mailbox ">" ">" [CFWS]
```

<uMailbox> is defined in [RFC5336]; <Mailbox> and <A-d-l> are defined in [RFC5321], section 4.1.2.

Two headers "Downgraded-Mail-From:" and "Downgraded-Rcpt-To:" are defined to preserve SMTP envelope downgraded information. The header field syntax is specified as follows:

```
fields             =/ downgradedmailfrom / downgradedrcptto
downgradedmailfrom =  "Downgraded-Mail-From:" unstructured CRLF
downgradedrcptto   =  "Downgraded-Rcpt-To:"   unstructured CRLF
```

The unstructured content is downgraded-envelope-addr treated as if it were unstructured with [RFC2047] encoding (and charset UTF-8) as needed.

3.2. Address header field preservation headers

The address header fields preservation headers are defined to preserve the original header field. Their value field holds the original header field value. The header field syntax is specified as follows:

```
fields =/ known-downgraded-headers ":" unstructured CRLF
known-downgraded-headers =  "Downgraded-" original-headers
original-headers         = "From" / "To" / "Cc" / "Bcc" /
                           "Sender" / "Reply-To" /
                           "Resent-From" / "Resent-Sender" /
                           "Resent-To" / "Resent-Cc" / "Return-Path"
```

Preserving a header field in a downgraded header field is defined as:

1. Generate new downgraded header field whose value is the original header field value.
2. Treat the generated header field content as if it were unstructured, and then apply [RFC2047] encoding with charset UTF-8 as necessary so the result is ASCII.

3.3. Unknown header fields preservation headers

The unknown header fields preservation headers are defined to encapsulate those original header fields which contain non-ASCII characters and are not otherwise provided for in the this specification. The encapsulation header field name is the concatenation of "Downgraded-" and the original name. The value field holds the original header field value.

The header field syntax is specified as follows:

```
fields     =/ unknown-downgraded-headers ":" unstructured CRLF
unknown-downgraded-headers =  "Downgraded-" original-header-field-name
original-header-field-name = field-name

field-name      =       1*ftext

ftext           =       %d33-57 /               ; Any character except
                        %d59-126                ;  controls, SP, and
                                                ;  ":".
```

Encapsulating a header field in a "Downgraded-" header field is defined as:

1. Generate new "Downgraded-" header field whose value is the original header field value.
2. Treat the generated header field content as if it were unstructured, and then apply [RFC2047] encoding with charset UTF-8 as necessary so the result is ASCII.
3. Remove the original header field.

Applying this procedure to "Received" header field is prohibited.

4. SMTP Downgrading

Target of downgrading elements in SMTP envelope are below:

- o <reverse-path> of MAIL FROM command
- o <forward-path> of RCPT TO command
- o ORCPT parameter of RCPT TO command

4.1. Path element downgrading

Downgrading the <path> of MAIL FROM and RCPT TO commands uses ALT-ADDRESS parameter defined in [RFC5336]. A SMTP command is downgradable if the <path> contains non-ASCII address and the command has an ALT-ADDRESS parameter which specifies an ASCII address. Since only non-ASCII addresses are downgradable, specifying an ALT-ADDRESS value for an all-ASCII address is invalid for use with this specification, and no interpretation is assigned to it. This restriction allows for future extension of the specification even though no such extensions are currently anticipated.

Note that even if no downgrading is performed on the envelope, message header fields and message body MIME header fields that contain non-ASCII characters MUST be downgraded. This is described in Section 5 and Section 6.

When downgrading, replace each <path> which contains non-ASCII mail address with its specified alternative ASCII address and preserve the original information using "Downgraded-Mail-From" and "Downgraded-Rcpt-To" header fields as defined in Section 3. Before replacing, decode the ALT-ADDRESS parameter value because it is encoded as xtext [RFC3461].

To avoid disclosing recipient addresses, the downgrading process MUST NOT add "Downgraded-Rcpt-To:" header if the SMTP downgrading targets multiple recipients. See Section 7 for more detail.

As a result of the recipient address downgrading, the domain part of the recipient address prior to downgrading might be different from the domain part of the new recipient address. If the result of address resolution for the domain part of the new recipient address contains the server at the connection destination of the SMTP session for the recipient address prior to downgrading, the SMTP connection is valid for the new recipient address. Otherwise, the downgrading process MUST NOT send the downgraded message to the new recipient address via the connection and MUST try to send the downgraded message to the new recipient address.

4.2. ORCPT downgrading

The "RCPT TO" command can have an ORCPT parameter if the DSN extension [RFC3461] is supported. If the ORCPT parameter contains an "utf-8" type address and the address contains raw non-ASCII

characters, the address MUST be converted to utf-8-addr-unitext form or utf-8-addr-xtext form which are described in [RFC5337].

The utf-8-addr-unitext transformation that needs to occur on the content of ORCPT is to

1. remove xtext encoding.
2. convert the result of step 1 to utf-8-addr-unitext form where all non-ASCII characters and '\' are represented as EmbeddedUnicodeChar.
3. re-apply xtext encoding to the result of step 2.

5. Email header fields downgrading

This section defines the conversion method to ASCII for each header field which may contain non-ASCII characters.

[RFC5335] expands Received: header fields, [RFC5322] ABNF elements <mailbox>, <word>, <comment>, <unstructured>, [RFC2045] ABNF element <value>.

Header field downgrading is defined below for each ABNF element. Downgrading an unknown header field is also defined as ENCAPSULATION downgrading. Converting the header field terminates when no non-ASCII characters remain in the header field.

RECEIVED downgrading:

If the header field name is "Received:" and the FOR clause contains a non-ASCII addresses, remove the FOR clause from the header field. Other parts (not counting <comment>s) don't contain non-ASCII values.

UNSTRUCTURED downgrading:

If the header field has an <unstructured> field which contains non-ASCII characters, apply [RFC2047] encoding with charset UTF-8.

WORD downgrading:

If the header field has any <word> fields which contains non-ASCII characters, apply [RFC2047] encoding with charset UTF-8.

COMMENT downgrading:

If the header field has any <comment> fields which contains non-ASCII characters, apply [RFC2047] encoding with charset UTF-8.

MIME-VALUE downgrading:
If the header field has any <value> elements defined by [RFC2045] and the elements contain non-ASCII characters, encode the <value> elements by [RFC2231] with charset UTF-8 and the Language information empty. If the <value> element is <quoted-string> and it contains <CFWS> outside the DQUOTE, remove the <CFWS> before this conversion.

DISPLAY-NAME downgrading:
If the header field has any <address> (<mailbox> and <group>) elements and they have <display-name> elements which contain non-ASCII characters, encode the <display-name> elements according to [RFC2047] with charset UTF-8. DISPLAY-NAME downgrading is the same algorithm as WORD downgrading.

MAILBOX downgrading:
The <mailbox> elements have no equivalent format for non-ASCII addresses. If the header field has any <mailbox> elements which contain non-ASCII characters, preserve the header field in each Address header field preservation header defined in Section 3.2, and rewrite each <mailbox> element to ASCII only format. The <mailbox> element which contains non-ASCII characters is one of three formats.

* [Display-name] "<" Utf8-addr-spec 1*FCS "<" Addr-spec ">>"

  Rewrite it as

  [Display-name] "<" Addr-spec ">"

* [Display-name] "<" Utf8-addr-spec ">"
* Utf8-addr-spec

  Rewrite both as
  [Display-name] "Internationalized Address " Encoded-word
  " Removed:;"

  where the <Encoded-word> is the original <Utf8-addr-spec> encoded according to [RFC2047].

ENCAPSULATION downgrading:
if the header field contains non-ASCII characters and for which no rule is given above, encapsulate it in a Downgraded header field described in Section 3.3 as a last resort.

TYPED-ADDRESS downgrading:
If the header field contains <utf-8-type-addr> defined in [RFC5337] and the <utf-8-type-addr> contains raw non-ASCII characters, it is utf-8-address form and convert it to utf-8-addr-xtext form or utf-8-addr-unitext form. COMMENT downgrading is also performed in this case. If the address type is unrecognized and the header contains non-ASCII characters, then fall back to using ENCAPSULATION downgrading on the entire header.

5.1. Downgrading method for each header field

Header fields are listed in [RFC4021]. This section describes the downgrading method for each header field.

If the whole mail header field does not contain non-ASCII characters, email header field downgrading is not required. Each header field's downgrading method is described below.

- Address header fields which contain <address>s

  From:
  Sender:
  Reply-To:
  To:
  Cc:
  Bcc:
  Resent-From:
  Resent-Sender:
  Resent-To:
  Resent-Cc:
  Resent-Bcc:
  Resent-Reply-To:
  Return-Path:
  Disposition-Notification-To:

  If the header field contains <mailbox> elements which contains non-ASCII addresses, preserve the header field in a downgraded header before the conversion. Then perform COMMENT downgrading, DISPLAY-NAME downgrading and MAILBOX downgrading.

- Address header fields with typed addresses

  Original-Recipient:

Final-Recipient:

If the header field contains non-ASCII characters, perform TYPED-ADDRESS downgrading.

- Downgrading Non-ASCII in comments

Date:
Message-ID:
Resent-Message-ID:
In-Reply-To:
References:
Resent-Date:
Resent-Message-ID:
MIME-Version:
Content-ID:
Content-Transfer-Encoding:
Content-Language:
Accept-Language:
Auto-Submitted:

These header fields do not contain non-ASCII characters except in comments. If the header contains UTF-8 characters in comments, perform COMMENT downgrading.

- Received header field

Received:

perform COMMENT downgrading and RECEIVED downgrading.

- MIME Content header fields

Content-Type:
Content-Disposition:

Perform MIME-VALUE downgrading and COMMENT downgrading.

- Non-ASCII in <unstructured>

Subject:
Comments:
Content-Description:

Perform UNSTRUCTURED downgrading.

- Non-ASCII in <phrase>

  Keywords:

  Perform WORD downgrading.

- Other header fields

  All other header fields which contains non-ASCII characters are user-defined, missing from this draft or future defined header fields. Perform ENCAPSULATION downgrading.

  If the software understands the header's structure and a downgrading algorithm other than ENCAPSULATION is applicable, that software SHOULD use that algorithm; ENCAPSULATION downgrading is used as a last resort.

  Any List-* header field containing non-ASCII characters will be turned into Downgraded-List-* header fields.

6. MIME body part headers downgrading

MIME body part header fields may contain non-ASCII characters [RFC5335]. This section defines the conversion method to ASCII only header fields for each MIME header field which contains non-ASCII characters. Parse the message body's MIME structure for all levels and check each MIME header field whether it contains non-ASCII characters. If the header field contains non-ASCII characters in the header value, the header is a target of the MIME body part headers downgrading. Each MIME header field's downgrading method is described below. COMMENT downgrading, MIME-VALUE downgrading, UNSTRUCTURED downgrading are described in Section 5.

Content-ID:
: The Content-ID: header does not contain non-ASCII characters except in comments. If the header contains UTF-8 characters in comments, perform COMMENT downgrading.

Content-Type:
Content-Disposition:
: Perform MIME-VALUE downgrading and COMMENT downgrading.

Content-Description:
: Perform UNSTRUCTURED downgrading.

7. Security considerations

- A Downgraded message's header fields contain ASCII characters only. But they still contain MIME encapsulated header fields which contains non-ASCII UTF-8 characters. Furthermore, the body part may contain UTF-8 characters. Implementations parsing Internet messages need to accept UTF-8 body parts and UTF-8 header fields which are MIME encoded. Thus it inherits the security considerations of MIME encoded headers [RFC2047] and [RFC3629].
- Rewriting headers increases the opportunities for undetected spoofing. However rewritten header fields are preserved into Downgraded-* header fields and parsing Downgraded-* header fields enables detecting spoofing caused by downgrading.

- Addresses that do not appear in the message headers may appear in the RCPT commands to an SMTP server for a number of reasons. Copying information from the Envelope into headers risks inadvertent information disclosure (see [RFC5321] and Section 4). Mitigating inadvertent information disclosure is discussed in same place.

- The techniques described here invalidates methods that depend on digital signatures over the envelope or any part of the message which includes the top-level header or body part headers. Depending on the specific message being downgraded, DKIM especially, but also possibly S/MIME, PGP, and similar techniques are all likely to break. The two obvious mitigations are to stick to 7-bit transport when using these techniques (as most/all of them presently require), or make sure you have UTF8SMTP end-to-end when needed.

- Many gateways and servers on the Internet will discard headers with which they are not familiar. To the extent to which the downgrade procedures depend on new headers (e.g., "Downgraded-") to avoid information loss, the risk of having those headers dropped and its implications must be identified. In particular, if the Downgraded headers are dropped, there is no possibility of reconstructing the original information at any point (before, during, or after delivery). Such gateways violate [RFC2979] and can be upgraded to correct the problem.

See "Security considerations" section in [RFC4952] for more discussion.

8. Implementation notes

8.1. RFC 2047 encoding

While [RFC2047] has a specific algorithm to deal with whitespace in adjacent encoded-words, there are a number of deployed implementations that fail to implement the algorithm correctly. As a result, whitespace behavior is somewhat unpredictable in practice when multiple encoded words are used. While RFC 5322 states that implementations SHOULD limit lines to not more than 78 characters, implementations MAY choose to allow overlong encoded words in order to work around faulty [RFC2047] implementations. Implementations that choose to do so SHOULD have an optional mechanism to limit line length to 78 characters.

8.2. Trivial downgrading

Downgrading is an alternative to avoid the rejection of messages which require UTF8SMTP support by a server which does not provide this. Implementing the full specification of this document is desirable, but a partial implementation is also possible.

If a partial downgrading implementation confronts an unsupported downgrading target, the implementation MUST NOT send the message to a server which does not support UTF8SMTP. Instead, it MUST reject the message or generate a notification of non-deliverability.

A partial downgrading, Trivial downgrading is discussed. It does not support non-ASCII addresses in SMTP envelope and address header fields, unknown header fields downgrading, the MIME body part headers downgrading. It supports

- some simple header fields downgrading: Subject
- comments and display name downgrading: From, To, Cc
- trace header field downgrading: Received

Otherwise, the downgrading fails.

Trivial downgrading targets mail messages which are generated by UTF8SMTP aware MUAs and contain non-ASCII characters in comments, display names, unstructured parts without using non-ASCII E-mail addresses. This mail message does not contain non-ASCII E-mail addresses in the SMTP Envelope and its header fields. But it is not deliverable via a UTF8SMTP un-aware SMTP server. Implementing full specification downgrading may be hard, but trivial downgrading saves mail messages without using non-ASCII addresses.

8.3. 7bit transport consideration

The SMTP client may encounter a SMTP server which does not support the 8BITMIME SMTP extension [RFC1652]. The server does not support "8bit" or "binary" data. Implementers need to consider converting "8bit" data to "base64" or "quoted-printable" encoded form and adjust the "Content-Transfer-Encoding" header field accordingly. If the body contains multiple MIME parts, this conversion MUST be performed for each MIME part.

9. IANA Considerations

IANA is requested to register the following header fields in the Permanent Message Header Field Repository, in accordance with the procedures set out in [RFC3864].

Header field name: Downgraded-Mail-From
Applicable protocol: mail
Status: experimental
Author/change controller: IETF
Specification document(s): This document (Section 3)

Header field name: Downgraded-Rcpt-To
Applicable protocol: mail
Status: experimental
Author/change controller: IETF
Specification document(s): This document (Section 3)

Header field name: Downgraded-From
Applicable protocol: mail
Status: experimental
Author/change controller: IETF
Specification document(s): This document (Section 3)

Header field name: Downgraded-Sender
Applicable protocol: mail
Status: experimental
Author/change controller: IETF
Specification document(s): This document (Section 3)

Header field name: Downgraded-To
Applicable protocol: mail
Status: experimental

Author/change controller: IETF
Specification document(s): This document (Section 3)

Header field name: Downgraded-Cc
Applicable protocol: mail
Status: experimental
Author/change controller: IETF
Specification document(s): This document (Section 3)

Header field name: Downgraded-Reply-To
Applicable protocol: mail
Status: experimental
Author/change controller: IETF
Specification document(s): This document (Section 3)

Header field name: Downgraded-Bcc
Applicable protocol: mail
Status: experimental
Author/change controller: IETF
Specification document(s): This document (Section 3)

Header field name: Downgraded-Resent-From
Applicable protocol: mail
Status: experimental
Author/change controller: IETF
Specification document(s): This document (Section 3)

Header field name: Downgraded-Resent-To
Applicable protocol: mail
Status: experimental
Author/change controller: IETF
Specification document(s): This document (Section 3)

Header field name: Downgraded-Resent-Cc
Applicable protocol: mail
Status: experimental
Author/change controller: IETF
Specification document(s): This document (Section 3)

Header field name: Downgraded-Resent-Sender
Applicable protocol: mail
Status: experimental
Author/change controller: IETF
Specification document(s): This document (Section 3)

Header field name: Downgraded-Return-Path
Applicable protocol: mail
Status: experimental
Author/change controller: IETF
Specification document(s): This document (Section 3)

Furthermore, IANA is requested to refuse registration of all the field names that start with "Downgraded-" for unknown header fields downgrading described in Section 3.3 to avoid conflicts with existing IETF activity (Email Address Internationalization).

10. Acknowledgements

Significant comments and suggestions were received from John Klensin, Harald Alvestrand, Chris Newman, Randall Gellens, Charles Lindsey, Marcos Sanz, Alexey Melnikov, Frank Ellermann, Edward Lewis, S. Moonesamy and JET members.

11. Change History

This section is used for tracking the update of this document. Will be removed after finalize.

11.1. draft-yoneya-ima-downgrade: Version 00

- Initial version
- Followed draft-yeh-ima-utf8headers-00 and draft-yao-smtpext-00

11.2. draft-yoneya-ima-downgrade: Version 01

- Document structure was changed
- Followed draft-yeh-ima-utf8headers-01 and draft-yao-smtpext-02
- Downgrading requirements were added
- SMTP DATA encapsulation method was proposed
- Downgrading examples was provided

11.3. draft-ietf-eai-downgrade: Version 00

- Followed draft-yeh-ima-utf8headers-01 and draft-ietf-eai-smtpext-00
- No header downgrading method was proposed
- Header encapsulation method was proposed

11.4. draft-ietf-eai-downgrade: Version 01

- Followed draft-ietf-eai-utf8headers-00
- Header conversion and encapsulation method was merged
- Header conversion method was defined in detail

11.5. draft-ietf-eai-downgrade: Version 02

- Followed draft-ietf-eai-utf8headers-01 and draft-ietf-eai-smtpext-01
- Specification about algorithmic generated address is removed
- No header downgrading method was removed
- SMTP DATA encapsulation method was removed

11.6. draft-ietf-eai-downgrade: Version 03

- Followed draft-ietf-eai-utf8headers-03 and draft-ietf-eai-smtpext-03
- Downgraded: and Envelope-Downgraded: headers definition was added
- Mail header fields downgrading method was refined
- Examples in Appendix A were refined

11.7. draft-ietf-eai-downgrade: Version 04

- Followed draft-ietf-eai-utf8headers-06, draft-ietf-eai-smtpext-07 and draft-ietf-eai-dsn-02
- Downgrading requirements and conditions were moved to Introduction.
- Descriptions about upgrading were removed.
- SPF and DKIM discussion were removed.
- Added many header fields downgrading.
- Allow address literal rewriting without alternate ASCII address in header fields.
- Added MIME body part headers downgrading.
- Added ORCPT downgrading.

11.8. draft-ietf-eai-downgrade: Version 05

- fixed examples
  - ALT-ADDRESS parameter mistake
  - RFC2047(x) notation was changed to encoded-word format
- Added implementation consideration section and trivial downgrading
- Downgraded: and Envelope-Downgraded: headers are separated for each original headers.
- Removed list-* header fields downgrading
- Changed the way of writing the header field downgrading section

11.9. draft-ietf-eai-downgrade: Version 06

- Moved decoding downgraded messages as a separate document
- Added a text to UNSTRUCTURED downgrading
- Added "replacing SMTP connection" if necessary to SMTP downgrading.
- fixed examples

11.10. draft-ietf-eai-downgrade: Version 07

- Fixed some typos
- Added a text about 7bit transport

11.11. draft-ietf-eai-downgrade: Version 08

- Comments from the working group last call (wording)

11.12. draft-ietf-eai-downgrade: Version 09

- References

11.13. draft-ietf-eai-downgrade: Version 10

- Comments from AD Review

12. Normative References

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Appendix A. Examples

A.1. Downgrading example 1

This section shows an SMTP Downgrading example. Consider a mail message where:

- The sender address is "NON-ASCII-local@example.com" which is a non-ASCII address. Its ASCII alternative is "ASCII-local@example.com" and its display-name is "DISPLAY-local".
- The "To:" address is "NON-ASCII-remote1@example.net" which is a non-ASCII address. Its ASCII alternative is "ASCII-remote1@example.net" and its display-name is "DISPLAY-remote1".
- The "Cc:" address is a non-ASCII address "NON-ASCII-remote2@example.org" without alternative ASCII address. Its display-name is "DISPLAY-remote2".
- Three display-names contain non-ASCII characters.
- The Subject header is "NON-ASCII-SUBJECT" which contains non-ASCII characters.
- Assuming the "To:" recipient's MTA (example.net) does not support UTF8SMTP.
- assuming the "Cc:" recipient's MTA (example.org) supports UTF8SMTP.

The example SMTP envelope/message is shown in Figure 1. In this example, the "To:" recipient's session is the focus.

```
MAIL FROM: <NON-ASCII-local@example.com>
            ALT-ADDRESS=ASCII-local@example.com
RCPT TO: <NON-ASCII-remote1@example.net>
          ALT-ADDRESS=ASCII-remote1@example.net
RCPT TO: <NON-ASCII-remote2@example.org>
------------------------------------------------------------
Message-Id: MESSAGE_ID
Mime-Version: 1.0
Content-Type: text/plain; charset="UTF-8"
Content-Transfer-Encoding: 8bit
Subject: NON-ASCII-SUBJECT
From: DISPLAY-local <NON-ASCII-local@example.com
 <ASCII-local@example.com>>
To: DISPLAY-remote1 <NON-ASCII-remote1@example.net
 <ASCII-remote1@example.net>>
Cc: DISPLAY-remote2 <NON-ASCII-remote2@example.org>
Date: DATE

MAIL_BODY
```

Figure 1: Original envelope/message (example 1)

In this example, there are two SMTP recipients, one is "To:", the other is "Cc:". The SMTP downgrading treats To: session downgrading. Figure 2 shows SMTP downgraded example.

```
MAIL FROM: <ASCII-local@example.com>
RCPT TO: <ASCII-remote1@example.net>
-------------------------------------------------------------
Downgraded-Mail-From: =?UTF-8?Q?<NON-ASCII-local@example.com_?=
 =?UTF-8?Q?<ASCII-local@example.com>>?=
Downgraded-Rcpt-To: =?UTF-8?Q?<NON-ASCII-remote1@example.net_?=
 =?UTF-8?Q?<ASCII-remote1@example.net>>?=
Message-Id: MESSAGE_ID
Mime-Version: 1.0
Content-Type: text/plain; charset="UTF-8"
Content-Transfer-Encoding: 8bit
Subject: NON-ASCII-SUBJECT
From: DISPLAY-local <NON-ASCII-local@example.com
 <ASCII-local@example.com>>
To: DISPLAY-remote1 <NON-ASCII-remote1@example.net
 <ASCII-remote1@example.net>>
Cc: DISPLAY-remote2 <NON-ASCII-remote2@example.org>
Date: DATE

MAIL_BODY
```

Figure 2: SMTP Downgraded envelope/message (example 1)

After SMTP downgrading, header fields downgrading is performed. Final downgraded message is shown in Figure 3. Return-Path header will be added by the final destination MTA.

```
Return-Path: <ASCII-local@example.com>
Downgraded-Mail-From: =?UTF-8?Q?<NON-ASCII-local@example.com_?=
 =?UTF-8?Q?<ASCII-local@example.com>>?=
Downgraded-Rcpt-To: =?UTF-8?Q?<NON-ASCII-remote1@example.net_?=
 =?UTF-8?Q?<ASCII-remote1@example.net>>?=
Message-Id: MESSAGE_ID
Mime-Version: 1.0
Content-Type: text/plain; charset="UTF-8"
Content-Transfer-Encoding: 8bit
Subject: =?UTF-8?Q?NON-ASCII-SUBJECT?=
From: =?UTF-8?Q?DISPLAY-local?= <ASCII-local@example.com>
Downgraded-From: =?UTF-8?Q?DISPLAY-local_<NON-ASCII-local@example.com_?=
 =?UTF-8?Q?<ASCII-local@example.com>>?=
To: =?UTF-8?Q?DISPLAY-remote1?= <ASCII-remote1@example.net>
Downgraded-To: =?UTF-8?Q?DISPLAY-remote1_?=
 =?UTF-8?Q?<NON-ASCII-remote1@example.net_<ASCII-remote1@example.net>>?=
Cc: =?UTF-8?Q?DISPLAY-remote2?= Internationalized address
 =?UTF-8?Q?NON-ASCII-remote2@example.org?= removed:;
Downgraded-Cc: =?UTF-8?Q?DISPLAY-remote2_?=
 =?UTF-8?Q?<NON-ASCII-remote2@example.org>?=
Date: DATE

MAIL_BODY
```

Figure 3: Downgraded message (example 1)

A.2. Downgrading example 2

In many cases, the sender wants to use non-ASCII address and the recipient is a traditional mail user. The SMTP server handing mail for the recipient and/or the recipient's MUA does not support UTF8SMTP extension. Consider a mail message where:

- The sender address is "NON-ASCII-local@example.com" which is a non-ASCII address. Its ASCII alternative is "ASCII-local@example.com". It has a display-name "DISPLAY-local" which contains non-ASCII characters.
- The "To:" address is "ASCII-remote1@example.net" which is ASCII only. It has a display-name "DISPLAY-remote1" which contains non-ASCII characters.
- The "Subject:" header is "NON-ASCII-SUBJECT" which contains non-ASCII characters.

The second example envelope/message is shown in Figure 4.

```
MAIL From: <NON-ASCII-local@example.com>
            ALT-ADDRESS=ASCII-local@example.com
RCPT TO: <ASCII-remote1@example.net>
-------------------------------------------------------------
Message-Id: MESSAGE_ID
Mime-Version: 1.0
Content-Type: text/plain; charset="UTF-8"
Content-Transfer-Encoding: 8bit
Subject: NON-ASCII-SUBJECT
From: DISPLAY-local <NON-ASCII-local@example.com
 <ASCII-local@example.com>>
To: DISPLAY-remote1 <ASCII-remote1@example.net>
Date: DATE

MAIL_BODY
```

Figure 4: Original message (example 2)

In this example, SMTP session is downgradable. Figure 5 shows SMTP downgraded envelope/message.

```
MAIL From: <ASCII-local@example.com>
RCPT TO: <ASCII-remote1@example.net>
-------------------------------------------------------------
Downgraded-Mail-From: =?UTF-8?Q?<NON-ASCII-local@example.com_?=
 ?=UTF8?Q?<ASCII-local@example.com>>?=
Message-Id: MESSAGE_ID
Mime-Version: 1.0
Content-Type: text/plain; charset="UTF-8"
Content-Transfer-Encoding: 8bit
Subject: NON-ASCII-SUBJECT
From: DISPLAY-local <NON-ASCII-local@example.com
 <ASCII-local@example.com>>
To: DISPLAY-remote1 <ASCII-remote1@example.net>
Date: DATE

MAIL_BODY
```

Figure 5: SMTP Downgraded envelope/message (example 2)

After SMTP downgrading, header fields downgrading is performed. The downgraded example is shown in Figure 6.

```
Return-Path: <ASCII-local@example.com>
Downgraded-Mail-From: =?UTF-8?Q?<NON-ASCII-local@example.com_?=
 =?UTF8?Q?<ASCII-local@example.com>>?=
Message-Id: MESSAGE_ID
Mime-Version: 1.0
Content-Type: text/plain; charset="UTF-8"
Content-Transfer-Encoding: 8bit
Subject: =?UTF-8?Q?NON-ASCII-SUBJECT?=
Downgraded-From: =?UTF-8?Q?DISPLAY-local_<NON-ASCII-local@example.com_?=
 =?UTF-8?Q?<ASCII-local@example.com>>?=
From: =?UTF-8?Q?DISPLAY-local?= <ASCII-local@example.com>
To: =?UTF-8?Q?DISPLAY-remote1?= <ASCII-remote1@example.net>
Date: DATE

MAIL_BODY
```

Figure 6: Downgraded message (example 2)

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